

**IN THE CLAIMS:**

Please cancel, without prejudice, claims 1-48.

Please add the following new claims:

49. (New) A mass calibration apparatus for a mass analyzer, comprising:

an ion source for providing analyte ions to the mass analyzer;

ion optics, situated between the ion source and the mass analyzer, for assisting the motion of the analyte ions from the ion source to the mass analyzer; and

a source of lock mass ions including a lock mass source and a lock mass ionization source adjacent the ion optics for creating lock mass ions within the ion optics;

wherein the lock mass ionization source comprises a photoionization source.

50. (New) The mass calibration apparatus of claim 49, wherein the lock mass source comprises a gas source and the ion optics has a central axis, the gas source introducing gas orthogonally with respect to the central axis of the ion optics.

51. (New) The mass calibration apparatus of claim 49, wherein the ion optics includes at least two vacuum stages, a first of the at least two vacuum stages being situated upstream with respect to a second of the at least two vacuum stages.

52. (New) The mass calibration apparatus of claim 51, wherein the lock mass ionization source is situated in the second vacuum stage of the ion optics.

53. (New) The mass calibration apparatus of claim 51, wherein the lock mass ionization source is situated externally and adjacent to the second vacuum stage of the ion optics.

54. (New) A method for mass calibration of analyte ions with lock masses in a mass spectrometer that includes an analyte ion source, ion optics and a mass analyzer, said method comprising:

introducing lock mass molecules into the ion optics; and

photoionizing the lock mass molecules within the ion optics.

55. (New) The method of claim 54, wherein the ion optics includes at least two vacuum stages, a first of the at least two vacuum stages being situated upstream with respect to a second of the at least two vacuum stages.

56. (New) The method of claim 55, wherein the photoionization of the lock mass molecules within the ion optics takes place within the second vacuum stage.

57. (New) The method of claim 54, wherein the lock mass molecules are introduced into the ion optics in gaseous form.

58. (New) The method of claim 55, further comprising:

directing the gas including the lock mass molecules orthogonally with respect to a longitudinal axis of the ion optics.